REMARKS

This communication is responsive to the Official Action of November 22, 2000 in which the claims remaining after a restriction requirement, i.e. remaining Claims 1-18 and 22-25 were rejected. (1-2) The Official Action made final the restriction requirement. (3-4) Claims 23-25 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite. (5-6) Claims 1-13, 17-18, and 22-25 were rejected under 35 U.S.C. 103(a) as obvious over Holman (U.S. Pat. 4,640,736). (7) Claims 14-16 were rejected under 35 U.S.C. 103(a) as obvious over Holman (U.S. Pat. 4,640,736) in view of Japanese Patent Document JP 04249215.

Applicant has cancelled Claims 14-18 and 23-25. Applicant has amended Claims 1-4, 6, 7-12, and 22. Applicant has added new Claims 27-48.

(3-4) Rejection of Claims 23-25 under 35 U.S.C. 112:

Claims 23-25 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite.

Applicant has cancelled claims 23-25.

(5-6) Rejection of Claims 1-13, 17-18, and 22-25 under 35 U.S.C. 103(a):

Claims 1-13, 17-18, and 22-25 were rejected under 35 U.S.C. 103(a) as obvious over Holman (U.S. Pat. 4,640,736). Holman was cited as teaching a method for annealing comprising heating the structure in a sealed oxygen gas atmosphere at a pressure exceeding ambient atmospheric pressure, maintaining pressure and temperature for an annealing period, and cooling to room temperature. (Office Action of 11/22/00 at page 3).

Applicant has cancelled Claims 17-18 and 23-25. Applicant has amended Claims 1-4, 6, 7-12, and 22. Applicant has added new Claims 27-48. Applicant has amended all remaining independent Claims 1, 9, 22 and various of the dependent claims depending there from.

In the amended Independent Claims 1 and 22 Applicant has added the limitation to the heating act of:

".... *heating the lithium niobate structure in a sealed pure oxygen gas (O_2) atmosphere substantially lacking in H_2O; ...*" (Applicant's amended Claims 1).

".... *heating the lithium tantalate structure in a sealed pure oxygen gas (O_2) atmosphere substantially lacking in H_2O; ...*" (Applicant's amended Claims 22).

The above referenced limitation is neither taught nor suggested in the Holman reference. In fact the Holman reference specifically teaches away from such limitation when at numerous locations throughout the reference it is indicated that water vapor is introduced into the annealing process. *"To achieve the preferred fabrication environment the crucible and crystalline member are heated in an oven containing pure oxygen which has been moistened to elevate its humidity."* (Holman at Col. 2, Lines 40-44 Emphasis Added). *"A preferred oven would contain essentially pure oxygen having a relative humidity of over 50%."* (Holman at Col. 6, Lines 9-11 Emphasis Added).

These teachings are directly contrary to the Applicant's claimed limitation which is supported at numerous locations throughout the applications specification. *"It should be noted that the atmosphere is a pure oxygen gas environment, no H_2O is present and thus no free protons or other radicals are given off that would adversely affect the $LiNbO_3$.* " (Applicant at Page 12, Lines 12-15).

In Independent Claim 9 applicant has added the following limitation:

"...locating a lithium niobate powder proximate to the lithium niobate structure to retard outgassing of lithium oxide (Li_2O) from the lithium niobate structure;

heating the lithium niobate structure and the lithium niobate powder in a sealed oxygen gas (O_2) atmosphere; ..." (Applicant's independent Claim 9).

Nothing in the cited Holman reference teaches or suggests such limitation.

The applicant's amended Independent Claims 1, 9, and 22 contain either the heating or locating limitations for which no corresponding methods are taught or suggested in the Holman reference. All claims depending there from, i.e. 2-8 depending from amended Independent Claim 1; 10-13 together with new Claims 45-48 depending from amended

Independent Claim 9; as well as new Claims 27-34 depending from amended Independent Claim 22 include either the heating or locating limitations and other limitations of independent significance.

(7) **Rejection of Claims 14-16 under 35 U.S.C. 103(a):**

Claims 14-16 were rejected under 35 U.S.C. 103(a) as obvious over Holman (U.S. Pat. 4,640,736) in view of Japanese Patent Document JP 04249215.

Applicant has cancelled Claims 14-16.

New Claims 27-48:

Applicant has added new claims new Claims 45-48 which depend from amended Independent Claim 9. Applicant has also added new Claims 27-34 depending from amended Independent Claim 22. Applicant has added new Independent Claim 35 and Claims 36-43 depending there from. The independent Claim 35 directed to annealing Lithium Tantalate structures includes the locating limitation discussed above in connection with Independent Claim 9.

Markup:

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned **"Version with markings to show changes made."**

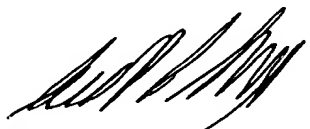
CONCLUSION

Claims 1-13, 19-22 and 27-48 are present for examination. Amended Independent Claims 1,9, 22 and new Independent Claim 35 are believed allowable over the Holman reference for the reasons discussed above. The dependent claims from each of the aforementioned independent claims are also believed allowable for the same reasons and for other reasons of independent

significance. Applicant therefore requests allowance of the pending claims. Early notice to this effect is solicited.

The Commissioner is authorized to charge any additional fees which may be required, including petition fees and extension of time fees, to Deposit Account No. 50-1338 (Docket No. NFC1PC2806).

Respectfully submitted,



CARY & KELLY, LLP

Charles C. Cary
Registration No. 36,764

1875 Charleston Rd.
Mountain View, CA 94043
(650) 533-4844

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 14-18 and 23-25 have been cancelled.

Please amend Claims 1-4, 6, 7-12, and 22 and add new Claims 27-48 as follows:

1. (Amended) A method for annealing a lithium niobate ($LiNbO_3$) structure[s], the method comprising:

heating [a] the lithium niobate structure in a sealed pure oxygen gas (O_2) atmosphere substantially lacking in H_2O; [to a temperature within a range of about 150 degrees Celsius to about 1000 degrees Celsius;]

pressurizing the sealed pure oxygen gas atmosphere to exceed ambient atmospheric pressure;

maintaining temperature and pressure for an anneal period; and

cooling to room temperature.

2. (Amended) The method of claim 1 wherein said heating act [occurs at a rate within the range of about 0.5 degrees Celsius per minute to about 12.0 degrees per minute.] further comprises:

locating a lithium niobate powder proximate to the lithium niobate structure to retard outgassing of lithium oxide (Li_2O) from the lithium niobate structure.

3. (Amended) The method of claim [1] 2 [wherein said heating is within a temperature range of about 300 degrees Celsius to about 600 degrees Celsius.] wherein the locating act further comprises:

separating the lithium niobate powder from the lithium niobate structure with an interface porous to lithium oxide gas outgassed from the lithium niobate powder and the interface substantially without porosity to the lithium niobate powder.

4. (Amended) The method of claim [1] 3 wherein [said heating is to a temperature of about 300 degrees Celsius.] the interface includes a porosity of approximately 20 microns.

6. (Amended) The method of claim 1 wherein said [pressurizing is to a pressure of about 6 psi above ambient atmospheric pressure.] heating is within a temperature range of about 300 degrees Celsius to about 1000 degrees Celsius.

8. (Amended) The method of claim 1 wherein said [cooling occurs at a rate of about 1.0 degrees Celsius per minute.] heating occurs at a rate within the range of about 0.5 degrees Celsius per minute to about 12.0 degrees per minute.

9. (Amended) A method for annealing a lithium niobate ($LiNbO_3$) structure[s], the method comprising:

locating a lithium niobate powder proximate to the lithium niobate structure to retard outgassing of lithium oxide (Li_2O) from the lithium niobate structure;

heating [a] the lithium niobate structure and the lithium niobate powder in a sealed oxygen gas (O_2) atmosphere [to a temperature within a range of about 300 degrees Celsius to about 400 degrees Celsius] ;

pressurizing the sealed oxygen gas atmosphere to a pressure [within the range of about 2 psi above ambient atmospheric pressure to about 25 psi] above ambient atmospheric pressure;

maintaining temperature and pressure for [a minimum period of about 4 hours]an anneal period ; and

cooling to room temperature.

10. (Amended) The method of claim 9 wherein said locating act further comprises: [heating occurs at a rate of about 1.0 degree Celsius per minute.]

separating the lithium niobate powder from the lithium niobate structure with an interface porous to lithium oxide gas outgassed from the lithium niobate powder and the interface substantially without porosity to the lithium niobate powder.

11. (Amended) The method of claim [9] 10 wherein [said heating is to a temperature of 300 degrees Celsius.] the interface includes a porosity of approximately 20 microns.

12. (Amended) The method of claim 9 [wherein said pressurizing is to a pressure of about 6 psi above ambient atmospheric pressure.] with a sealed pure oxygen gas atmosphere substantially lacking in H_2O.

22. (Amended) A method for annealing a lithium tantalate ($LiTaO_3$) structure[s], the method comprising:

heating a lithium tantalate structure in a sealed pure oxygen gas (O_2) atmosphere substantially lacking in H_2O [to a temperature within a range of about 150 degrees Celsius to about 1000 degrees Celsius;]

pressurizing the sealed pure oxygen gas atmosphere to exceed ambient atmospheric pressure;

maintaining temperature and pressure for an anneal period; and

cooling to room temperature.

27. (New) The method of claim 22 wherein the heating act further comprises:

locating a lithium tantalate powder proximate to the lithium tantalate structure to retard outgassing of lithium oxide (Li_2O) from the lithium tantalate structure.

28. (New) The method of claim 22 wherein the locating act further comprises:

separating the lithium tantalate powder from the lithium tantalate structure with an interface porous to lithium oxide gas outgassed from the lithium tantalate powder and the interface substantially without porosity to the lithium tantalate powder.

29. (New) The method of claim 22 wherein the interface includes a porosity of approximately 20 microns.

30. (New) The method of claim 22 wherein the heating is within a temperature range of about 300 degrees Celsius to about 1000 degrees Celsius.

31. (New) The method of claim 22 wherein said cooling occurs within a ranges of rates of about 0.5 degrees Celsius per minute to about 40 degrees Celsius per minute.

32. (New) The method of claim 22 wherein the pressurizing is within a pressure range of about 2 psi above ambient atmospheric pressure to about 25 psi above ambient atmospheric pressure.

33. (New) The method of claim 22 wherein the heating occurs at a rate within the range of about 0.5 degrees Celsius per minute to about 12.0 degrees per minute.

34. (New) The method of Claim 22, wherein the lithium tantalate structure includes at least one of: an optical modulator and an optical waveguide.

35. (New) A method for annealing a lithium tantalate ($LiTaO_3$) structure, the method comprising:

locating a lithium tantalate powder proximate to the lithium tantalate structure to retard outgassing of lithium oxide (Li_2O) from the lithium tantalate structure;

heating the lithium tantalate structure and the lithium tantalate powder in a sealed oxygen gas (O_2) atmosphere;

pressurizing the sealed oxygen gas atmosphere to a pressure above ambient atmospheric pressure;

maintaining temperature and pressure for an anneal period ; and

cooling to room temperature.

36. (New) The method of claim 35 wherein said locating act further comprises:

separating the lithium tantalate powder from the lithium tantalate structure with an interface porous to lithium oxide gas outgassed from the lithium tantalate powder and the interface substantially without porosity to the lithium tantalate powder.

37. (New) The method of claim 36 wherein the interface includes a porosity of approximately 20 microns.

38. (New) The method of claim 35 with a sealed pure oxygen gas atmosphere substantially lacking in H_2O.

39. (New) The method of claim 35 wherein said heating is within a temperature range of about 300 degrees Celsius to about 1000 degrees Celsius.

40. (New) The method of claim 35 wherein said heating occurs at a rate within the range of about 0.5 degrees Celsius per minute to about 12.0 degrees per minute.

41. (New) The method of claim 35 wherein said pressurizing is within a pressure range of about 2 psi above ambient atmospheric pressure to about 25 psi above ambient atmospheric pressure.

42. The method of claim 35 wherein said cooling occurs within a range of rates of about 0.5 degrees Celsius per minute to about 40 degrees Celsius per minute.

43. (New) The method of Claim 35, wherein the lithium tantalate structure includes at least one of: an optical modulator and an optical waveguide.

44. (New) The method of Claim 1, wherein the lithium niobate structure includes at least one of: an optical modulator and an optical waveguide.

45. (New) The method of claim 9 wherein said heating is within a temperature range of about 300 degrees Celsius to about 1000 degrees Celsius.

46. (New) The method of claim 9 wherein said heating occurs at a rate within the range of about 0.5 degrees Celsius per minute to about 12.0 degrees per minute.

47. (New) The method of claim 9 wherein said pressurizing is within a pressure range of about 2 psi above ambient atmospheric pressure to about 25 psi above ambient atmospheric pressure.

48. (New) The method of Claim 9, wherein the lithium niobate structure includes at least one of: an optical modulator and an optical waveguide.